

A revision of the *brunnea*-group of the genus *Dicraspeda* Chaudoir

(Insecta, Coleoptera, Carabidae, Odacanthinae)

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The species of the *brunnea*-group of the Australasian odacanthine genus *Dicraspeda* Chaudoir are revised and four new species are described: *D. angulipennis* from Halmahera, Ternate, and Morotai Islands, *D. papuensis* and *D. nigripes* from Papua New Guinea, and *D. glabrata* from Cape York Peninsula, northern Queensland, Australia. *D. sublaevis* (Macleay) from northern Australia is reevaluated to full specific status from synonymy with *D. brunnea* Chaudoir. A key and checklist for all species of this group is added.

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Introduction

The odacanthine genus *Dicraspeda* Chaudoir is widely distributed through the Indoaustralian realm from Indonesia and the Philippine Islands through the Moluccas, New Guinea, New Britain to northern Australia, and in the southeast it is recorded as far as from Solomon Islands and Vanuatu (New Hebrides). This fairly speciose genus is polymorphic, and in New Guinea and northern Australia it includes several species that were formerly classified in the subgenera (or even separate genera) *Philemonia* Liebke and *Macrocentra* Chaudoir. That this subgeneric concept is rather weak can be gathered from such species as either *D. minuta* Baehr, or *D. dubia* (Gestro) and *D. longiloba* (Liebke) that in some ways are intermediary between the former 'subgenera' *Dicraspeda* s. str. (called '*brunnea*-group' in this paper) and *Philemonia* ('*bispinosa*-group' in the sense of Darlington 1968). *D. minuta*, for example, is nearer to *Dicraspeda* s. str. in some character states (Baehr 1998), whereas *D. dubia* and *D. longiloba* in shape and structure are rather closely attached to *Philemonia*. Hence, for the present, no subgenera are acknowledged, and the polymorphism within the genus is accommodated by distinction of three species-groups, namely the *brunnea*-, *bispinosa*-, and

quadrispinosa-groups as used already by Darlington (1968), without taking a decision about the phylogenetic relations of these groups, or even, whether all groups are monophyletic.

This procedure has been chosen, because at least the monophyly of the *bispinosa*-group is doubtful with regard to such 'primitive' species as *D. dubia* (Gestro) and *D. minuta* Baehr. So, it would be conceivable that the bulk of species of the *bispinosa*-group is more closely related to the *quadrispinosa*-group (former genus or subgenus *Macrocentra* Chaudoir) than to either *D. minuta* Baehr or *D. dubia* (Gestro). The *brunnea*-group, however, most probably is a monophyletic unit, and were it not for the intermediate *D. minima* (Baehr), this group likely could be classified as an own genus.

At present, most species of the genus are known from New Guinea, where representatives of all three species-groups occur, and from Australia. Currently 18 species are recognized (Csiki 1932, Darlington 1968, Louwerens 1970, Moore et al. 1987, Baehr 1996, 1997, 1998, 2000, Lorenz 1998), of which 10 would belong to '*Philemonia*' and two to '*Macrocentra*'. In the present paper four additional species of the *brunnea*-group are described as new, and *D. sublaevis* (Macleay) is reevaluated from synonymy with *D. brunnea* Chaudoir.

Material and methods

Altogether c. 75 specimens of the *brunnea*-group were available for this study. Apparently, specimens of this species-group seem to be rare beetles, or, at least, they are not commonly collected.

For the taxonomic treatment standard methods are used. The male genitalia were removed from specimens soaked for a night in a jar under wet atmosphere, then cleaned for a short while in hot KOH.

For examination of the generally fine though taxonomically highly important puncturation and microreticulation of the surface a stereo microscope with up to 64x magnification was used, supported by a lamp of high intensity giving natural light that could be focussed. For exact definition of the microsculpture such light is preferable, because fibre-glass optics substantially change the impression of the surface structures.

The habitus photographs were obtained by a digital camera using SPOT Advanced for Windows 3.5 and subsequently were worked with Corel Photo Paint 10.

Measurements

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Lengths, therefore, may slightly differ from those of other authors. Length of pronotum was measured along midline, width of pronotum at widest part, width of base of pronotum at the extreme tips of the basal angles. Length of eye includes a small dark coloured ring of ocellae behind the light area. Ratios are somewhat variable in most species, but generally they offer rather good measures of relative shape.

Abbreviations of collections mentioned in text

ANIC	Australian National Insect Collection, Canberra
ANIC-MMS	Australian National Insect Collection, Canberra, as permanent loan from Macleay Museum, Sydney
BMNH	The Natural History Museum, London
CBM	Working Collection M. Baehr at Zoologische Staatssammlung, München
CBM-ZSM	Zoologische Staatssammlung, München, as permanent loan in Working Collection M. Baehr
CBS	Collection R. Bejsak, Sydney
IRSNB	Institut Royal de Sciences Naturelles, Bruxelles
MNHN	Museum National de l'Histoire Naturelle, Paris
NMV	Museum of Victoria, Melbourne
QMB	Queensland Museum, Brisbane
SAMA	South Australian Museum, Adelaide

SMNS	Staatliches Museum für Naturkunde, Stuttgart
ZMUC	Zoological Museum of the University of Copenhagen

Characters

Since all species of the *brunnea*-group are very closely related and therefore the male genitalia are remarkably similar throughout the group, external characters like general body shape, shape of eyes, pronotum, apex of elytra, striation, puncturation and microreticulation of elytra, and colour of legs and antennae are better suitable for the distinction of the species. In particular depth and puncturation of the elytral striae and shape and extent of microreticulation on the intervals are highly characteristic for any species and should be carefully investigated under high magnification.

Habits

Very little is known about the habits of most species of the genus *Dicraspeda*, and in particular of those of the *brunnea*-group. Of the material at hand, some specimens were collected at light, others were fogged (e.g. the series of *D. hebridarum* Baehr that was probably sampled from the lower reaches of tree trunks), a few were collected in pitfall traps on the ground, but most specimens have been sifted from litter in lowland rain forest. Characteristically, no one specimen has been sampled near water. This habit is characteristic for many of the more 'primitive' Australian-New Guinean odacanthines that, deviating from the many 'normal' hygrophilous, commonly reed-inhabiting odacanthine beetles of other continents, prefer habitats away from water.

According to Darlington (1968), members of the genus *Dicraspeda* – at least in New Guinea – are claimed to live 'in understory foliage of rain forest'. That this is not the general way of life, or that it may apply only for certain species, is demonstrated by the various collecting circumstances noted above. Although some species certainly live in rain forest, others, e.g. *D. sublaevis* (Macleay), have been collected by the author in fairly open, even semiarid country in northern Australia, and even the rain forest living species may inhabit rather the leaf litter on the ground than foliage.

Probably, Darlington's statement may apply only for those species of the *bispinosa*- ('*Philemonia*') and *quadriscopiosa*-groups ('*Macrocentra*'), that possess more or less deeply bilobed 4th tarsomeres, and the tarsi of which are clothed with elongate, adhesive hairs in both sexes. Both of these character states suggest an arboricolous or at least a planti-

colous mode of life. In all species of the *brunnea*-group, however, the 4th tarsomeres are barely excised and the lower surface of the tarsi lacks such adhesive hairs, though is only furnished with comparatively sparse bristles. This difference corroborates the supposed ground-dwelling habits of the species of the *brunnea*-group.

The bispinose or even quadrispinose elytral apices found in most species of the *bispinosa*- and *quadrispinosa*-groups – except for few species that possess only a denticulate apex – likewise indicate tree-living habits of these species that perhaps run on leaves much alike members of the well known arboricolous carabid genera *Demetriida* Chaudoir or *Agra* Fabricius, most species of which likewise possess spined elytra. It has been suggested that spinose elytra may act as a protection from insect-eating birds, because these insects are more difficult to swallow then. However, spinose elytra even may simply dismember the outline of the beetle and thus give some protection against enemies. Perhaps, both means are working together.

In the *brunnea*-group, however, the sutural angle of the elytra is never spined, and even the external angles mostly are rounded off, whereas these are distinctly angulate or even somewhat acute in all species of the *bispinosa*-group. The absence of any spines at the apex of the elytra in the *brunnea*-group, therefore, is strong evidence that the species are not threatened in the same way by birds, which again indicates a litter-inhabiting life rather than tree-living habits.

Apart from the mentioned collecting circumstances, virtually nothing is known about habits, diet, and life history; and from my knowledge, no larvae of any species were recorded so far.

Genus *Dicraspeda* (s. str.) Chaudoir

Dicraspeda Chaudoir, 1862: 300; Sloane 1923: 30; Csiki 1932: 1536; Liebke 1938: 88; Darlington 1968: 210; Moore et al. 1987: 274; Baehr 1996: 138; 1997: 30; 1998: 174; Lorenz 1998: 420.

Type species: *Dicraspeda brunnea* Chaudoir, 1862, by monotypy.

Note. Both named Australian species of the *brunnea*-group [*D. nitida* (Sloane) and *D. sublaevis* (Macleay)] originally were described under the generic name *Eudalia* Castelnau, which belongs to a related genus that is distinguished from *Dicraspeda* s.l. mainly by absence of the characteristic lateral sulcus on the pronotum and by the punctate head (Baehr 1999). For a long period both genera were not clearly distinguished and even Sloane (1917), in his review of

the Australian Odacanthinae, united the species of both genera under the name *Eudalia*. In a second paper Sloane (1923) then reevaluated *Dicraspeda* and arranged the species more adequately.

The *brunnea*-group

In the *brunnea*-group (former subgenus *Dicraspeda* s. str.) species are united that combine the following distinguishing characters: Shape of body rather wide, depressed, in particular with respect to elytra; generally not spined elytral apices; very large, laterally remarkably protruding eyes, depressed prothorax bearing a wide, depressed, coarsely punctate lateral sulcus that is medially margined by a distinct ridge. Species of this group range from the Greater Sunda Islands except for Sumatra, and the Philippines through the Moluccas and New Guinea to northern Australia, the Solomon Islands and New Hebrides (Vanuatu). Thus, the range of the *brunnea*-group is by far greater than the ranges of the *bispinosa*- and *quadrispinosa*-groups that do not occur on either Sunda Islands (including Sulawesi) or Philippine Islands, and are rare in northern Australia where they only occur in a restricted area in the northernmost part of northern Queensland.

The *brunnea*-group at present includes five species (Moore et al. 1987, Lorenz 1998) and in addition *D. sublaevis* (Macleay) that so far was rendered synonymous with *D. brunnea* Chaudoir.

Dicraspeda brunnea Chaudoir

Figs 8, 9, 20

Chaudoir, 1862: 300; Sloane 1923: 31; Csiki 1932: 1536; Liebke 1938: 89; Darlington 1968: 210; Moore et al. 1987: 274; Baehr 1996: 138, 139; 1997: 30; 1998: 174; Lorenz 1998: 420.

Examined types. Lectotype (by present designation): A fragment of a male specimen, of which only major parts of the abdomen and the right elytron are left, *brunnea* Chaud. Célebes Wallace, (ex Chaudoir Coll., MNHM).

Note. It is difficult to decide, whether the differences in shape and structure between the specimens available from Sulawesi, Bali, Lombok, Borneo, the Philippines, and Thailand only refer to intraspecific variation within a single species, whether these populations, or at least parts of them, belong to different taxa, be it subspecies or even species. Because male genitalia, when present, are very similar in all populations, as they are throughout the whole *brunnea*-group, for the present and until no new evidence is available, all insular and mainland populations are

regarded parts of a widespread species that is rather variable in size and relative shape of prothorax and elytra.

The specimens from Sulawesi stand out through their large size and their comparatively narrow head.

Diagnosis. Characterized by yellow legs, deeply impressed and coarsely punctate elytral striae, and distinct microreticulation on the elytra. Distinguished from most similar species *D. sublaevis* (Macleay) by more convex elytra with distinct impression in anterior third, and considerably coarser puncturation of elytral striae.

Note. The male genitalia of this species (of a specimen from Lombok Island) have been figured in Baehr (1996, fig. 1).

Supplementary description (for comparison the body measurements and ratios of the various populations of different islands are tabulated below).

Measurements: Length: 5.5-6.5 mm, width: 2.2-2.4 mm. Ratios. Length/width of pronotum: 1.11-1.16; width of head/width of pronotum: 1.07-1.16; length/width of elytra: 1.48-1.58.

	N	length	length/width of prothorax	width head/prothorax	length/width of elytra
<i>brunnea</i> (Sulawesi)	6	6.1-6.5	1.11-1.14	1.07-1.09	1.48-1.52
<i>brunnea</i> (Bali)	1	6.2	1.16	1.13	1.51
<i>brunnea</i> (Lombok)	2	6.1-6.2	1.12-1.15	1.13-1.15	1.50-1.52
<i>brunnea</i> (Borneo)	11	5.5-6.2	1.11-1.16	1.11-1.16	1.54-1.58
<i>brunnea</i> (Philippines)	2	5.9-6.0	1.11-1.15	1.10-1.11	1.49-1.51
<i>brunnea</i> (Thailand)	1	6.1	1.11	1.15	1.52

Variation. According to the available material this species seems to be rather variable concerning size, shape of eyes, prothorax, and elytra, and also to colouration of antennae and legs. The series from Borneo has remarkably narrow and elongate elytra and, at the average, it is rather small. The specimens from Sulawesi stand out through large size and comparatively narrow heads. However, the sample is too small for any attempt to distinguish local, or insular, or regional populations, or even to characterize populations by assigning nomenclatorial valid names to them.

Distribution. This species was noted by Darlington (1968) as occurring in New Guinea and by Moore et al. (1987) in Australia. The Australian records, however, refer to *D. sublaevis* (Macleay) which had been synonymized with *D. brunnea* for a long time, and the New Guinean records noted by Darlington (1968) with high probability also refer to other, new species described in the present paper. At any rate, I never saw specimens of *D. brunnea* from New Guinea nor Australia. Hence, at the present state of knowledge, *D. brunnea* is only known from various Indonesian and Philippine islands, and recently was also recorded from southernmost Thailand.

Additional material examined: 4♂♂, 4♀♀, BORNEO – MALAYSIA: Sabah: Mt. Kinabalu Park, vic. Serinsim sub-station / 6°12'N 116°33'E L. F. 180-250 m 30.VII.

1998 D. Bartsch & C. Häuser leg / *Dicraspeda brunnea* Chd. det. M. Baehr '99 (CBM, SMNS); 2♂♂, 1♀, BORNEO – MALAYSIA: Sabah: Mt. Kinabalu Park, Poring Hot Springs 600 m 20.VIII.1998 / canopy walkway (40 m) 6°03'N 116°42'E L. F. D. Bartsch & C. Häuser leg / *Dicraspeda brunnea* Chd. det. M. Baehr '99 (CBM, SMNS); 2♂♂, INDONESIA, LOMBOK IS. SENARO, N slope of Rinjani, 2.-5. Feb. 1994 Bolm lgt. 1100 m / *Dicraspeda brunnea* CHD. det. M. Baehr '95 (CBM, SMNS); 1♂, BALI, Gilimanuk, NE Cekik, 30-300 m / leg. A. Riedel 22.VI.2002 (CBM); 2♀♀, PHILIPPINES: LEYTE VISCA N Baybay, 1991 sec.-forest, 100-200 m leg. SCHAWALLER et al. / *Dicraspeda brunnea* CHD. det. M. Baehr '95 (CBM, SMNS); 1♂, S-Sulawesi Umg. Padang Bantimurung, 29.8.1990, leg. Riedel / *Dicraspeda brunnea* CHD. det. M. Baehr '91 (CBM); 1♂, Thailand, Karon Puket 12 Jul 98 leg. R. Rober (CBM); 2♀♀, Sulawesi Utara Dumoga Bone Nat. Park Rentice II (280 m), Station: 106 24.XI.1985 Leg. J. Van Stalle (IRSNB); 2♂♂, Sulawesi Utara Dumoga Bone Nat. Park Hogg's Bag subcamp (660 m) 15.XI.1985, Station 095 (IRSNB); 2♂♂, Sulawesi Utara Dumoga Bone Nat. Park subcamp Hogg's Bag (660 m) X.1985, Station: 048 (IRSNB); 1♂, Sulawesi Utara Dumoga Bone Nat. Park subcamp Barney's (300 m) X.1985, Station: 022 (IRSNB).

Relationships. By virtue of its distinct microreticulation and rather deeply impressed elytral striae *D. brunnea* probably is most closely related to *D. sublaevis* (Macleay) from Northern Territory and northwestern Australia.

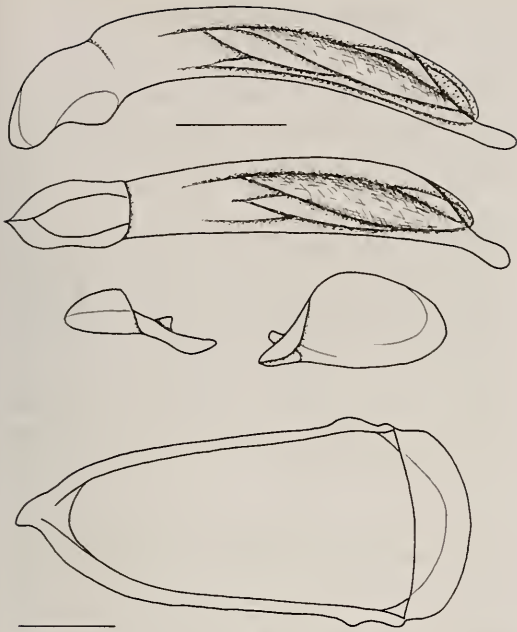


Fig. 1. *Dicraspeda nitida* (Sloane). Male genitalia: aedeagus, parameres, and genital ring; scale: 0.25 mm.

Dicraspeda sublaevis (Macleay) (stat. restit.)

Figs 10, 20

Macleay, 1888: 448 (*Eudalia*); Sloane 1917: 415 (*Eudalia*); 1923: 31; Csiki 1932: 1537; Moore et al. 1987: 274; Lorenz 1998: 420.

Examined types. Syntypes: 2 fragments, N. W. Australia, Syntype (ANIC-MMS).

Note. Sloane (1923) claimed that *D. sublaevis* (Macleay) should be synonymous with *D. brunnea* Chaudoir and all later authors followed him in this statement. However, careful comparison of Australian specimens assigned to *D. sublaevis* with specimens of '*D. brunnea*' from various localities clearly demonstrates several evident morphological differences as enumerated in the diagnosis and key. Hence, this species herewith is reevaluated to full specific status. The male genitalia have not yet been studied. For comparison the measurements and ratios are tabulated in the appendix.

Diagnosis. Characterized by yellow legs, deeply impressed elytral striae, and distinct microreticulation on the elytra. Distinguished from the most similar species of the *brunnea*-complex by more depressed elytra lacking any distinct impression in anterior third, and by far less coarse puncturation of the elytral striae.



Fig. 2. *Dicraspeda nitida* (Sloane). Female stylomeres 1 and 2; scale: 0.1 mm.

Note. The male genitalia are so far unknown. For comparison measurements and ratios of the available specimens are tabulated in the appendix.

Distribution. The species seems to be distributed in the northern part of Northern Territory of Australia and in adjacent northwestern Australia. Apparently, in this area it replaces *D. nitida* Sloane which occurs in North Queensland.

Additional material examined: 3♀, Australien, NT 17 km ne. Willeroo 8.11.1984 M. Baehr / *Dicraspeda sublaevis* Macl. det. M. Baehr 1986 (CBM); 1♀, Australien, WA 26 km e. Napier Downs, Kimberleys, 23.11.1984 M. Baehr / *Dicraspeda sublaevis* Macl. det. M. Baehr 1986 (CBM); 1♀, Flora R. N. T. Coll by Prof. (unreadable) 1912 / 823 *Eudalia sublaevis* Macl. Det. by Sloan 6.13 (NMV); 1♀, Darwin G. F. Hill / *Eudalia sublaevis* Macl. Id. by T. G. Soane (SAMA); 1♀, Derby. N.W.A. W. D. Dodd / J.7708 N. W. Australia (SAMA).

Dicraspeda nitida (Sloane)

Figs 1, 2, 11, 20

Sloane, 1917: 420 (*Eudalia*); Csiki 1932: 1537; Moore et al. 1987: 275; Lorenz 1998: 420.

Examined types. Holotype: Kuranda, Qld. / Type *Eudalia nitida* Sl. Id. by T. G. Sloane (ANIC).

Note. Although Csiki (1932) noted *D. nitida* as synonymous with *D. brunnea*, this decision was not followed neither by Moore et al. (1987) nor by Lorenz (1998). Indeed, *D. nitida* is rather different in certain morphological characters from *D. brunnea* and certainly is a separate species. For comparison the body measurements and ratios are tabulated in the appendix, and the male genitalia are described and

figured for the first time.

Male genitalia (Fig. 1). Genital ring rather narrow and elongate, symmetric, slightly narrowed to the short, acute apex. Aedeagus slender and elongate, laterally slightly sinuate, lower surface very gently concave. Apex moderately elongate, slightly turned to the right, barely knobbed, straight.

Female genitalia (Fig. 2). Stylocere 2 rather elongate, evenly curved laterally, with acute apex. With two stout ventro-lateral ensiform setae, a rather large dorso-median ensiform seta, and a single short nematiform seta arising from a groove in apical third. Base of stylocere 1 with c. 7 elongate ensiform setae.

Diagnosis. Characterized by yellow legs, barely impressed but rather coarsely punctate elytral striae, and weak though perceptible microreticulation on the elytra. Distinguished from the most similar species *D. hebridarum* Baehr and *D. glabrata*, spec. nov. by longer, less oviform elytra lacking any distinct transverse impression in anterior third; further distinguished from *D. hebridarum* by more transverse orbits, and from *D. glabrata* by narrower pronotum and presence of microreticulation on the elytra.

Distribution. Apparently this species is fairly widely distributed in northeastern Queensland, in the North up to Cape Tribulation. Perhaps all Queensland records of *D. brunnea* Chaudoir refer to this species.

Additional material examined: 3♂♂, 2♀♀, Australia, Qld. Cape Tribulation 2. 1995 leg. Lamond / *Dicraspeda nitida* Sl. det. M. Baehr '95 (CBM); 1♀, AUS. Qld. 3.XII. 1988 Helenvale, UV light Vr. R. Beysak lgt. (CBS); 1♂, NEQ: 16°18'S × 145°05'E Windsor Tblid, SE open for 9 Feb-17 May 1998, 850 m G. B. Monteith & D. J. Cook Pitfall, open forest. 1890 (QMB); 1♀, Noah Creek Qld. 16°08'S 145°25'E 27 July 1993 H. Mitchell R Kitching / Bp-14-5 (CRC); 1♀, N. E. Qld: 19.16S, 147.03E Mt. Cleveland summit 23 Mar 1991. Monteith Pyrethr. Rain For. 500 m (QMB); 1♂, Etty Bay, via Innisfail N. Qld. 24 Oct 1980 G. B. Monteith Pyrethrum, rainforest (QMB); 1♂, 1♀, Kuranda N. Q. 22.3.52 C. Oke / *Dicraspeda nitida* Sl. Det. B. P. Moore (NMV); 1♂, Stewart R. Q. Jan.-Feb. 1927 Hale & Tindale (SAMA); 1♂, 1♀, Cairns dist.: F. D. Dodd (SAMA); 1♂, 1♀, Cape York Queensland / Lea 19177 / J.7077 Queensland (SAMA); 1♂, Cape York Queensland (SAMA); 1♂, Cairns Allen / = J.7077 of S.A. Mus. / 19177 Queensland (SAMA).

Dicraspeda obsoleta Baehr

Figs 12, 20

Baehr, 1996: 140; 1997: 30; 1998: 174; Lorenz 1998: 420.

Examined types. Holotype: ♂, Irian Jaya, Biak Is. Umg. Sepse, 3.10.1990, leg. A. Riedel / HOLOTYPE *Dicraspeda obsoleta* sp. nov. det. M. Baehr '94 (ZSM-CBM).

Diagnosis. Characterized by yellow legs and absence of microreticulation on the elytra. Distinguished at the first glance from all other yellow-legged species by extremely fine puncturation of the absolutely not impressed elytral striae, apically slightly darkened antennae, and rather oblique orbits.

Note. The male genitalia of this species have been figured in Baehr (1996, fig. 2). For comparison the body measurements and ratios are tabulated in the appendix.

Distribution. Known only from the holotype sampled on Biak Island, northwestern Irian Jaya, New Guinea.

Additional material examined: None.

Dicraspeda hebridarum Baehr

Figs 13, 20

Baehr, 1998: 175.

Examined types. Holotype: ♂, New Hebrides, Aneityum. Red Crest. 1,200 ft. 3 m. N.E. of Anelgauhat. III.1955 / L. E. Cheesman. B. M. 1955-217 / HOLOTYPE *Dicraspeda hebridarum* sp. nov. Det. M. Baehr '97 (BMNH).

Diagnosis. Characterized by yellow legs, barely impressed but rather coarsely punctate elytral striae, and weak though perceptible microreticulation on the elytra. Distinguished from the most similar species *D. nitida* (Sloane) and *D. glabrata*, spec. nov. by more oblique orbits; further distinguished from *D. nitida* by shorter, more oviform elytra, and from *D. glabrata* by absence of any transverse impression in anterior third of elytra and presence of microreticulation on the elytra.

Note. The male genitalia of this species have been figured in Baehr (1998, fig. 3). The female genitalia are very similar to those of *D. nitida* (Sloane). For comparison the body measurements and ratios are tabulated in the appendix.

Distribution. Vanuatu (New Hebrides). So far recorded from Aneityum and Irikl Islands.

Additional material examined: 5♂♂, 2♀♀, VANUATU: Irikl Is. 17°45'S × 166°18'E 31 Aug 1999. 7857 G. Thompson. pyreth. remnant rainforest (CBM, QMB).

Dicraspeda glabrata, spec. nov.

Figs 3, 14, 20

Examined types. Holotype: ♂, AUST: QLD: NE: West Claudie R., Iron Range 5 Dec 1985 G. Monteith / QM Berlesate No. 692 12.45S 143.14E Rainforest, 50 m Sieved litter (QMB). – Paratypes: 2♂♂, 2♀♀, same data (CBM, QMB).

Diagnosis. Characterized by yellow legs, not impressed and rather finely punctate elytral striae, and absence of any traces of microreticulation from the elytra. Distinguished from most similar species *D. nitida* (Sloane) and *D. hebridarum* Baehr by total lack of microreticulation and presence of an impression in anterior third of elytra; further distinguished from *D. nitida* by shorter, more oviform elytra, and from *D. hebridarum* by more transverse orbits.

Description

Measurements. Length: 5.8-6.1 mm, width: 2.2-2.35 mm. Ratios. Length/width of pronotum: 1.05-1.09; width of head/width of pronotum: 1.07-1.11; length/width of elytra: 1.47-1.50.

Colour. Upper and lower surfaces of head and pronotum uniformly deep black, elytra dark piceous-black, lateral channel indistinctly lighter, abdomen piceous. Labrum piceous, mandibles, palpi, antennae, and legs uniformly reddish.

Head. Large, triangular, wider than pronotum, upper surface rather depressed. Eyes very large, almost twice as long as orbits, laterally remarkably projecting, considerably interrupting the lateral curve of head. Orbits very oblique, in same line with eyes, though anteriorly even very faintly concave, posteriorly slightly convex, forming a very distinct angle with neck. Distance between eyes > twice as wide as diameter of eye. Clypeus separated by a fine suture that is shortly interrupted in middle, posterior part transversely convex. Labrum large, anteriorly straight, 6-setose. Mandibles and palpi of average size, mandibles anteriorly regularly incurved. Labium with elongate, triangular tooth. Frons laterally near clypeal suture with a deep, oblique impression that begins with a circular groove, in middle of frons with a more or less distinct horseshoe-shaped impression. Medially of eye with a strong ridge. Neck separated from vertex by a shallow, transverse furrow. Posterior supraorbital seta situated behind posterior margin of eye. Antennae of average size, surpassing base of pronotum by about one antennomere. Median antennomeres almost twice as long as wide. Surface of head apart from labrum without microreticulation, impunctate and impilose, highly glossy.

Prothorax. Distinctly longer than wide, laterally rather convex, surface rather depressed. Widest

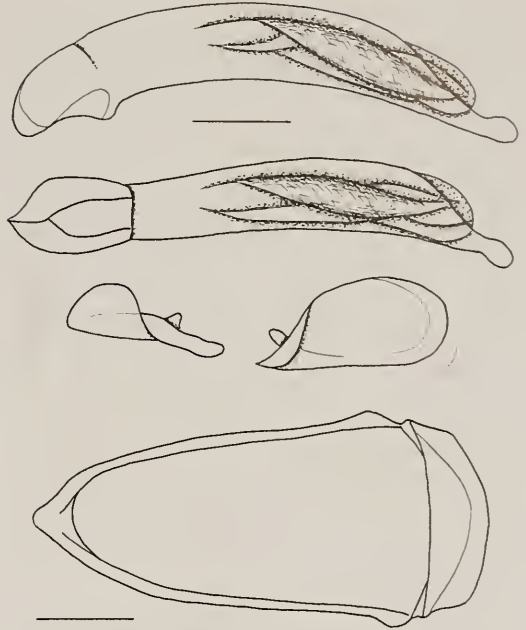


Fig. 3. *Dicraspeda glabrata*, spec. nov. Male genitalia: aedeagus, parameres, and genital ring; scale: 0.25 mm.

slightly in front of middle, margin gently rounded, near basal angles shortly and gently concave. Lateral border prominent, raised throughout, lateral margin with a deep and rather wide channel that considerably narrows towards apex and base. Channel abruptly bordered medially by a conspicuous ridge. Proepipleura and proepisternum narrowly visible from above. Apex almost straight, unbordered, anterior angles rounded off, barely visible. Base very gently convex, unbordered, posterior angles right though obtuse at apex. Median line deeply impressed, punctate-crenulate, not attaining base. Anterior transverse sulcus shallow, v-shaped, coarsely punctate, basal transverse sulcus barely impressed. Posterior marginal seta absent, anterior marginal pore and seta situated at widest part of pronotum, slightly inside of marginal border, seta elongate. Surface without microreticulation, median surface laterally slightly striolate, lateral sulcus, apex, base and disk near median sulcus sparsely though very coarsely punctate. Disk very glossy.

Elytra. Large in comparison with fore body, more than twice as wide as prothorax, rather quadrate, though posteriorly slightly widened and lateral margin in anterior third faintly compressed. Surface depressed, disk in basal third with shallow though distinct transverse impression. Humeri wide, almost evenly rounded. Marginal channel moderately wide. Apex wide, oblique, laterally moderate-

ly concave. Lateral apical angle clearly rounded, sutural angle obtuse, apex with coarse border line, particularly near lateral angles distinctly denticulate. All striae indicated, though only punctate, not impressed, intervals depressed. Puncturation becoming weaker in apical half. 3rd interval with four setiferous punctures, the 1st and 3rd ones situated in a slight impression. Anterior puncture situated at first third and close to 3rd stria, the median and apical ones adjacent to 2nd stria, the median puncture situated at posterior two fifth of elytra, both apical ones situated close together at apical sixth of elytra. The anterior three setae rather elongate, slightly inclined, the 4th seta considerably shorter and upright. Marginal series of setiferous punctures consisting of 6 anterior setae behind shoulder, 7 apical setae in front of lateral apical angles, 1 large intercaralar seta, and 2 setae near suture at apex. Most of surface without microreticulation that is only present in apical fourth or fifth, where it is highly superficial and consists of slightly transverse meshes. Surface highly glossy. Wings fully developed.

Lower surface. Prosternum, proepisternum, proepimeron, and mesepisternum with very coarse punctures, metasternum, metepisternum, and abdomen impunctate. Metepisternum elongate, slightly $>2\times$ as long as wide. Terminal sternum in male bisetose, in female quadrisetose, in male in middle slightly excised.

Legs. Rather elongate. 5th tarsomeres setose on lower surface, 4th tarsomeres with shallow ($<1/3$ of length) excision. Apex of 1st tarsomere and 2nd and 3rd tarsomeres of male anterior tarsus asymmetricaly, sparsely biserially squamose.

Male genitalia (Fig. 3). Genital ring rather narrow and elongate, symmetric, slightly narrowed to the obtusely rounded apex. Aedeagus slender and elongate, laterally slightly sinuate, lower surface very gently concave. Apex comparatively short, slightly turned to the right, distinctly knobbed and upturned.

Female genitalia. Very similar to those of *D. nitida* (Sloane).

Variation. Very little variation noted.

Distribution. Iron Range, mid of Cape York Peninsula, northeastern Queensland. Known only from type locality.

Collecting circumstances. Sieved from litter in lowland rain forest. This is probably a ground-living, non-hygrophilous species.

Etymology. The name refers to the glabrous elytra devoid of any microreticulation.

Dicraspeda papuensis, spec. nov.

Figs 4, 15, 20

Examined types. Holotype: ♂, Papua NG, Morobe-Pr. Tekadu-Kakaro, Ivimka Riv. Stat. 170 m, sifted, 3.3.1998, A. Riedel (CBM-ZSM). – Paratypes: 1♂, 1♀, same data (CBM).

Diagnosis. Characterized by yellow legs, barely impressed, moderately coarsely punctate elytral striae, and absence of microreticulation on the elytra. Distinguished from most similar species *D. obsoleta* Baehr and *D. glabrata*, spec. nov. by presence of a distinct transverse impression on the elytra; further distinguished from *D. obsoleta* by coarser puncturation of the elytra and shorter, more transverse orbits; and from *D. glabrata* by longer pronotum and longer elytra, and less deep excision of the apex of the elytra.

Description

Measurements. Length: 5.8-5.9 mm, width: 2.25-2.3 mm. Ratios. Length/width of pronotum: 1.07-1.13; width of head/width of pronotum: 1.10-1.13; length/width of elytra: 1.51-1.53.

Colour. Upper and lower surfaces of head and pronotum uniformly black, elytra not lighter, lateral channel indistinctly lighter, abdomen piceous. Labrum and mandibles piceous, palpi and 1st antennomere light brown, rest of antenna reddish, legs yellow though tibiae very slightly darker.

Head. Large, triangular, wider than pronotum, upper surface rather depressed. Eyes very large, almost twice as long as orbits, laterally remarkably projecting, considerably interrupting the lateral curve of head. Orbits very oblique, in same line with eyes, though anteriorly even very faintly concave, posteriorly slightly convex, forming a very distinct angle with neck. Distance between eyes $>$ twice as wide as diameter of eye. Clypeus separated by a fine suture that is shortly interrupted in middle, posterior part transversely convex. Labrum large, anteriorly straight, 6-setose. Mandibles and palpi of average size, mandibles anteriorly regularly incurved. Labium with elongate, triangular tooth. Frons laterally near clypeal suture with a deep, oblique impression that begins with a circular groove, in middle of frons with a more or less distinct horseshoe-shaped impression. Medially of eye with a strong ridge. Neck separated from vertex by a shallow, transverse furrow. Posterior supraorbital seta situated behind posterior margin of eye. Antennae of average size, surpassing base of pronotum by about one antennomere. Median antennomeres almost twice as long as wide. Surface of head apart from labrum without microreticulation, impunctate and impilose, highly glossy.

Prothorax. Considerably longer than wide, laterally rather convex, surface rather depressed. Widest slightly in front of middle, margin gently rounded, near basal angles shortly and gently concave. Lateral border prominent, raised throughout, lateral margin with a deep and rather wide channel that considerably narrows towards apex and base. Channel abruptly bordered medially by a conspicuous ridge. Proepipleura and proepisternum narrowly visible from above. Apex almost straight, unbordered, anterior angles rounded off, barely visible. Base very gently convex, unbordered, posterior angles right though obtuse at apex. Median line deeply impressed, punctate-crenulate, not attaining base. Anterior transverse sulcus shallow, v-shaped, coarsely punctate, basal transverse sulcus barely impressed. Posterior marginal seta absent, anterior marginal pore and seta situated at widest part of pronotum, slightly inside of marginal border, seta elongate. Surface without microreticulation, median surface laterally slightly striolate, lateral sulcus, apex, base and disk near median sulcus sparsely though coarsely punctate. Disk very glossy.

Elytra. Large in comparison with fore body, more than twice as wide as prothorax, rather quadrate, though posteriorly slightly widened and lateral margin in anterior third faintly compressed. Surface depressed, disk in basal third with shallow though distinct transverse impression. Humeri wide, almost evenly rounded. Marginal channel moderately wide. Apex wide, oblique, laterally moderately concave. Lateral apical angle clearly rounded, sutural angle obtuse, apex with coarse border line, particularly near lateral angles distinctly denticulate. All striae distinct, though only punctate, barely impressed, intervals depressed. Puncturation fairly coarse, becoming weaker in apical half. 3rd interval with four setiferous punctures, all situated in a slight impression. Anterior puncture situated at first third and close to 3rd stria, the median and apical ones adjacent to 2nd stria, the median puncture situated at posterior two fifth of elytra, both apical ones situated close together at apical sixth of elytra. The anterior three setae rather elongate, slightly inclined, the 4th seta considerably shorter and upright. Marginal series of setiferous punctures consisting of 6 anterior setae behind shoulder, 7 apical setae in front of lateral apical angles, 1 large intercalary seta, and 2 setae near suture at apex. Most of surface without microreticulation that is only present in apical fourth or fifth, where it is highly superficial and consists of slightly transverse meshes. Surface highly glossy. Wings fully developed.

Lower surface. Prosternum, proepisternum, proepimeron, and mesepisternum with very coarse punctures, metasternum, metepisternum, and ab-

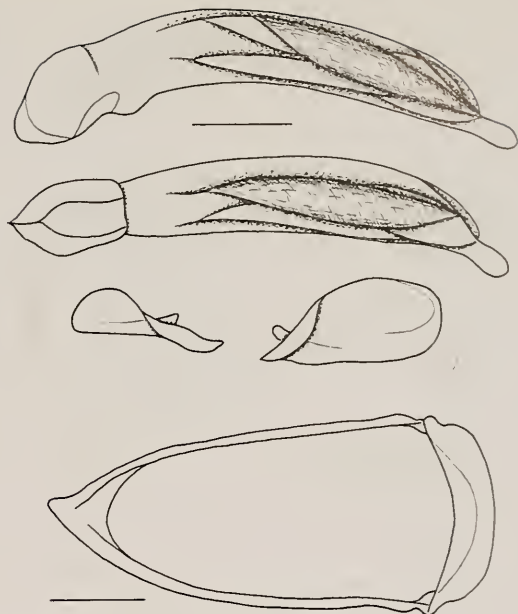


Fig. 4. *Dicraspeda papuensis*, spec. nov. Male genitalia: aedeagus, parameres, and genital ring; scale: 0.25 mm.

domen impunctate. Metepisternum elongate, slightly $>2\times$ as long as wide. Terminal sternum in male bisetose, in female quadrisetose, in male in middle slightly excised.

Legs. Rather elongate. 5th tarsomeres setose on lower surface, 4th tarsomeres with shallow ($<1/3$ of length) excision. Apex of 1st tarsomere and 2nd and 3rd tarsomeres of male anterior tarsus asymmetricaly, sparsely biserially squamose.

Male genitalia (Fig. 4). Genital ring rather narrow and elongate, rather symmetric, slightly narrowed to the angulate, slightly asymmetric apex. Aedeagus slender and elongate, laterally slightly sinuate, lower surface very gently concave. Apex comparatively short, slightly turned to the right, neither knobbed or upturned.

Female genitalia. Very similar to those of *D. nitida* (Sloane).

Variation. Slight variation noted in puncturation of elytral striae that varies to some degree in its coarseness.

Distribution. Eastern Papua New Guinea. Known only from type locality.

Collecting circumstances. Sieved from litter in lowland rain forest. This is probably a ground-living, non-hygrophilous species.

Etymology. The name refers to the distribution of this species in Papua New Guinea.

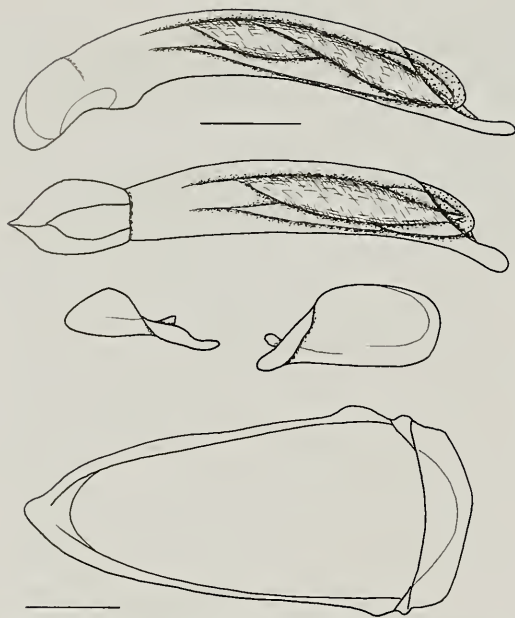


Fig. 5. *Dicraspeda nigripes*, spec. nov. Male genitalia: aedeagus, parameres, and genital ring; scale: 0.25 mm.

Dicraspeda nigripes, spec. nov.

Figs 5, 16, 20

Examined types. Holotype: ♂, Papua NG, Sandaun-Pr. Minamin 1000 m, sifted, 19.5.1998, A. Riedel (CBM-ZSM). - Paratypes: 1♂, same data (CBM); 2♂, Canopy mission P.N.G. Madang province Baiteta, FOG M4 22.IV.1993 Leg. Olivier Missa (IRSNB).

Diagnosis. Characterized by piceous legs, slightly darkened 1st antennomere, and comparatively deep impression in anterior third of elytra. Distinguished from most similar species *D. angulipennis*, spec. nov. by deeper transverse elytral impression, absence of microreticulation of elytra, and gently rounded external apical angle of elytra.

Description

Measurements. Length: 6.0-6.3 mm, width: 2.3-2.45 mm. Ratios. Length/width of pronotum: 1.11-1.13; width of head/width of pronotum: 1.11; length/width of elytra: 1.53-1.54.

Colour. Upper surface uniformly black, lateral channel of elytra indistinctly lighter, abdomen piceous. Labrum, mandibles, palpi, and 1st antennomere piceous, legs piceous, though tibiae slightly lighter.

Head. Large, triangular, wider than pronotum, upper surface rather depressed. Eyes very large, almost twice as long as orbits, laterally remarkably

projecting, considerably interrupting the lateral curve of head. Orbits moderately oblique, in same line with eyes, posteriorly slightly convex, forming a very distinct angle with neck. Distance between eyes > twice as wide as diameter of eye. Clypeus separated by a fine suture that is shortly interrupted in middle, posterior part transversely convex. Labrum large, anteriorly straight, 6-setose. Mandibles and palpi of average size, mandibles anteriorly regularly incurved. Labium with elongate, triangular tooth. Frons laterally near clypeal suture with a deep, oblique impression that begins with a circular groove, in middle of frons with a more or less distinct horseshoe-shaped impression. Medially of eye with a strong ridge. Neck separated from vertex by a shallow, transverse furrow. Posterior supraorbital seta situated behind posterior margin of eye. Antennae of average size, surpassing base of pronotum by about one antennomere. Median antennomeres almost twice as long as wide. Surface of head apart from labrum without microreticulation, impunctate and impilose, highly glossy.

Prothorax. Distinctly longer than wide, laterally rather convex, surface rather depressed. Widest slightly in front of middle, margin gently rounded, near basal angles shortly and gently concave. Lateral border prominent, raised throughout, lateral margin with a deep and rather wide channel that considerably narrows towards apex and base. Channel abruptly bordered medially by a conspicuous ridge. Proepipleura and proepisternum narrowly visible from above. Apex almost straight, unbordered, anterior angles rounded off, barely visible. Base very gently convex, unbordered, posterior angles right though obtuse at apex. Median line deeply impressed, punctate-crenulate, not attaining base. Anterior transverse sulcus rather shallow, v-shaped, coarsely punctate, basal transverse sulcus barely impressed. Posterior marginal seta absent, anterior marginal pore and seta situated at widest part of pronotum, slightly inside of marginal border, seta elongate. Surface without microreticulation, median surface laterally slightly striolate, lateral sulcus, apex, base and disk near median sulcus sparsely though coarsely punctate. Disk very glossy.

Elytra. Rather elongate, though large in comparison with fore body, more than twice as wide as prothorax, rather quadrate, though posteriorly slightly widened and lateral margin in anterior third faintly compressed. Surface depressed, disk in basal third with distinct transverse impression. Humeri wide, almost evenly rounded. Marginal channel moderately wide. Apex wide, oblique, laterally rather deeply concave. Lateral apical angle clearly rounded, sutural angle obtuse, apex with coarse border line, particularly near lateral angles distinctly den-

ticulate. All striae distinct, though only punctate, not impressed, intervals depressed. Punctuation rather coarse, becoming weaker in apical half. 3rd interval with four setiferous punctures, all situated in a slight impression. Anterior puncture situated at first third and close to 3rd stria, the median and apical ones adjacent to 2nd stria, the median puncture situated at posterior two fifth of elytra, both apical ones situated close together at apical sixth of elytra. The anterior three setae rather elongate, slightly inclined, the 4th seta considerably shorter and upright. Marginal series of setiferous punctures consisting of 6 anterior setae behind shoulder, 7 apical setae in front of lateral apical angles, 1 large intercalary seta, and 2 setae near suture at apex. Most of surface without microreticulation that is only indicated in apical fourth or fifth, where it is highly superficial and consists of slightly transverse meshes. Surface highly glossy. Wings fully developed.

Lower surface. Prosternum, proepisternum, proepimeron, and mesepisternum with very coarse punctures, metasternum, metepisternum, and abdomen impunctate. Metepisternum elongate, slightly $>2\times$ as long as wide. Terminal sternum in male bisetose, in middle slightly excised.

Legs. Rather elongate. 5th tarsomeres setose on lower surface, 4th tarsomeres with shallow ($<1/3$ of length) excision. Apex of 1st tarsomere and 2nd and 3rd tarsomeres of male anterior tarsus asymmetricaly, sparsely biserially squamose.

Male genitalia (Fig. 5). Genital ring rather narrow and elongate, almost symmetric, slightly narrowed to the obtusely rounded apex. Aedeagus slender and elongate, laterally slightly sinuate, lower surface very gently concave. Apex comparatively elongate, slightly turned to the right, very slightly knobbed and upturned.

Female genitalia. Unknown.

Variation. Apart from degree of coarseness of punctures of the elytra very little variation noted.

Distribution. Eastern Papua New Guinea.

Collecting circumstances. Holotype and one paratype sieved from litter in lowland rain forest. Two additional paratypes sampled by canopy fogging. However, no information is available, in which way fogging was performed, nor from which height the specimens were caught. Therefore, this is probably rather a ground-living, non-hygrophilous species that may climb the lower reaches of trees or scrubs.

Etymology. The name refers to the dark legs.

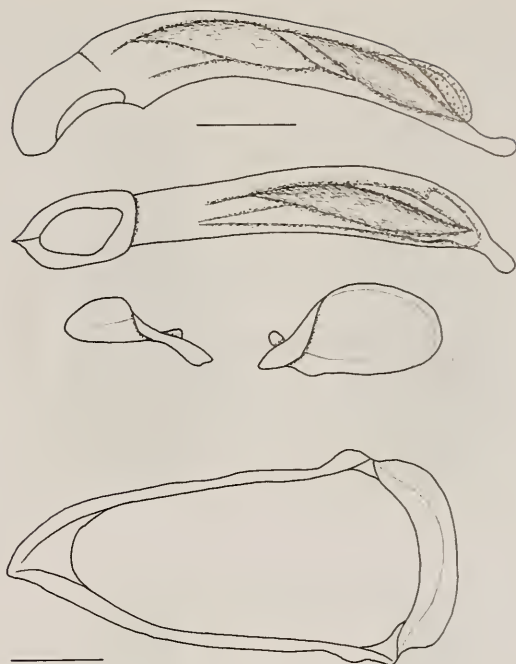


Fig. 6. *Dicraspeda inermis* Louwerens. Male genitalia: aedeagus, parameres, and genital ring; scale: 0.25 mm.

Dicraspeda inermis Louwerens
Figs 6, 17, 20

Louwerens, 1970: 91; Lorenz 1998: 420.

Examined types. Holotype: ♂, Rennell, Hutuna Soaika Hill 29 March, 1965 Torben Wolff leg. / Malaise trap / Holotype ♂ *Dicraspeda inermis* sp. n. Det. C. J. Louwerens (ZMUC).

Diagnosis. Characterized by piceous legs, slightly darkened 1st antennomere, and moderately deep impression in anterior third of elytra. Distinguished from *D. nigripes*, spec. nov. by less deep transverse elytral impression, presence of microreticulation of elytra, and sharply angulate external apical angle of elytra; and from most similar species *D. angulipennis*, spec. nov. by elytra in apical half barely widened though rather quadrate, less deep apical excision, and finer punctuation of striae.

Note. Louwerens (1970) gave an extensive description of the external morphology. The male genitalia are described and figured below. For comparison the body measurements and ratios of the holotype are tabulated in the appendix.

Measurements. Length: 6.3 mm, width: 2.5 mm. Ratios. Length/width of pronotum: 1.13; width of head/width of pronotum: 1.11; length/width of elytra: 1.51.

Male genitalia (Fig. 6). Genital ring rather narrow and elongate, almost symmetric, slightly narrowed to the obtuse, gently asymmetric apex. Aedeagus very slender and elongate, laterally slightly sinuate, lower surface very gently concave. Apex moderately elongate, suddenly turned to the right, distinctly knobbed and slightly upturned.

Female genitalia. Unknown.

Distribution. Solomon Islands. So far recorded only from Rennell Island. Apparently only the holotype is known.

Additional material examined: None.

Relationships. This species apparently is most closely related to *D. angulipennis*, spec. nov. from the Moluccas, with which it agrees in the dark femora, shape of head and of pronotum, degree of microreticulation of elytra, and the angulate apical angles of the elytra.

Dicraspeda angulipennis, spec. nov.

Figs 7, 18, 20

Examined types. Holotype: ♂, MALUKU: Is. Morotai, W. Darubam, Raja, 15.-16.XI.1999, 100-300 m, leg. A. Riedel (SMNS). - Paratypes: 1♂, MALUKU: Is. Ternate, Marikurubu, Gn. Gamalama, 29.X.1999, 700-1500 m, leg. A. Riedel (SMNS); 1♂, MALUKU: Is. Halmahera, Tobelo (SW), 1.XI.1999, 850 m, leg. A. Riedel (CBM).

Diagnosis. Characterized by piceous legs, slightly darkened 1st antennomere, and moderately deep impression in anterior third of elytra. Distinguished from *D. nigripes*, spec. nov. by less deep transverse elytral impression, presence of microreticulation of elytra, and sharply angulate external apical angle of elytra; and from most similar species *D. inermis* Louwerens by elytra in apical half distinctly widened, deeper apical excision, and coarser puncturation of striae.

Description

Measurements. Length: 6.1-6.7 mm, width: 2.4-2.5 mm. Ratios. Length/width of pronotum: 1.14-1.18; width of head/width of pronotum: 1.09-1.15; length/width of elytra: 1.52-1.55.

Colour. Upper surface uniformly black, lateral channel of elytra indistinctly lighter, abdomen piceous. Labrum, mandibles, and palpi piceous, antennae and legs reddish-piceous, tibiae barely lighter.

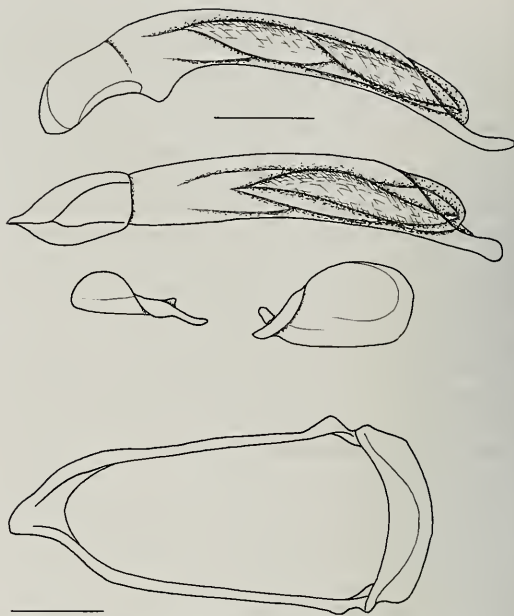


Fig. 7. *Dicraspeda angulipennis*, spec. nov. Male genitalia: aedeagus, parameres, and genital ring; scale: 0.25 mm.

Head. Large, triangular, wider than pronotum, upper surface rather depressed. Eyes very large, almost twice as long as orbits, laterally remarkably projecting, considerably interrupting the lateral curve of head. Orbits moderately oblique, in same line with eyes, posteriorly slightly convex, forming a very distinct angle with neck. Distance between eyes > twice as wide as diameter of eye. Clypeus separated by a fine suture that is shortly interrupted in middle, posterior part transversely convex. Labrum large, anteriorly straight, 6-setose. Mandibles and palpi of average size, mandibles anteriorly regularly incurved. Labium with elongate, triangular tooth. Frons laterally near clypeal suture with a deep, oblique impression that begins with a circular groove, in middle of frons with a barely indicated horseshoe-shaped impression. Medially of eye with a strong ridge. Neck separated from vertex by a shallow, transverse furrow. Posterior supraorbital seta situated behind posterior margin of eye. Antennae of average size, surpassing base of pronotum by about one antennomere. Median antennomeres almost twice as long as wide. Surface of head

Figs 8-18. Habitus (body size in brackets). 8. *Dicraspeda brunnea* Chaudoir from Sulawesi (6.5 mm). 9. *D. brunnea* ♂ (Chaudoir) from Borneo (6.0 mm). 10. *D. sublaevis* (Macleay) (6.1 mm). 11. *D. nitida* (Sloane) (6.0 mm). 12. *D. obsoleta* Baehr (5.8 mm). 13. *D. hebridarum* Baehr (6.4 mm). 14. *D. glabrata*, spec. nov. (5.8 mm). 15. *D. papuensis*, spec. nov. (5.9 mm). 16. *D. nigripes*, spec. nov. (6.0 mm). 17. *D. inermis* Louwerens (6.3 mm). 18. *D. angulipennis*, spec. nov. (6.7 mm).



8



9



10



11



12



13



14



15



16



17



18

apart from labrum without microreticulation, impunctate and impilose, highly glossy.

Prothorax. Distinctly longer than wide, laterally rather convex, surface rather depressed. Widest slightly in front of middle, margin gently rounded, near basal angles shortly and gently concave. Lateral border prominent, raised throughout, lateral margin with a deep and rather wide channel that considerably narrows towards apex and base. Channel abruptly bordered medially by a conspicuous ridge. Proepipleura and proepisternum narrowly visible from above. Apex almost straight, unbordered, anterior angles rounded off, barely visible. Base very gently convex, unbordered, posterior angles right though obtuse at apex. Median line deeply impressed, punctate-crenulate, not attaining base. Anterior transverse sulcus rather shallow, v-shaped, coarsely punctate, basal transverse sulcus shallow. Posterior marginal seta absent, anterior marginal pore and seta situated at widest part of pronotum, slightly inside of marginal border, seta elongate. Surface without microreticulation, median surface laterally rather distinctly striolate, lateral sulcus, apex, base and disk near median sulcus with comparatively dense and very coarse puncturation. Disk very glossy.

Elytra. Rather elongate, though large in comparison with fore body, more than twice as wide as prothorax, rather quadrate, though posteriorly slightly widened and lateral margin in anterior third faintly compressed. Surface moderately depressed, disk in basal third with extremely shallow transverse impression. Humeri wide, almost evenly rounded. Marginal channel moderately wide. Apex wide, oblique, laterally moderately concave. Lateral apical angle clearly angulate, sutural angle obtuse, apex with coarse border line, particularly near lateral angles distinctly denticulate. All striae distinct, though only punctate, not impressed, intervals depressed. Puncturation very coarse, becoming weaker in apical third. 3rd interval with four setiferous punctures, all situated in a comparatively deep im-

pression. Anterior puncture situated at first third and close to 3rd stria, the median and apical ones adjacent to 2nd stria, the median puncture situated at posterior two fifth of elytra, both apical ones situated close together at apical sixth of elytra. The anterior three setae rather elongate, slightly inclined, the 4th seta considerably shorter and upright. Marginal series of setiferous punctures consisting of 6 anterior setae behind shoulder, 7 apical setae in front of lateral apical angles, 1 large intercalary seta, and 2 setae near suture at apex. Surface with superficial though distinct microreticulation that consists of almost diametric to slightly transverse meshes. Surface highly glossy. Wings fully developed.

Lower surface. Prosternum, proepisternum, proepimeron, and mesepisternum with very coarse punctures, metasternum, metepisternum, and abdomen impunctate. Metepisternum elongate, slightly >2× as long as wide. Terminal sternum in male bisetose, in middle slightly excised.

Legs. Rather elongate. 5th tarsomeres setose on lower surface, 4th tarsomeres with shallow (<1/3 of length) excision. Apex of 1st tarsomere and 2nd and 3rd tarsomeres of male anterior tarsus asymmetricaly, sparsely biserially squamose.

Male genitalia (Fig. 7). Genital ring rather narrow and elongate, almost symmetric, slightly narrowed to the obtuse, gently asymmetric apex. Aedeagus very slender and elongate, laterally slightly sinuate, lower surface very gently concave. Apex comparatively elongate, slightly turned to the right, distinctly knobbed and considerably upturned.

Female genitalia. Unknown.

Variation. Very little variation noted.

Distribution. Moluccas. Known from Halmahera, Morotai, and Ternate Islands.

Collecting circumstances. Probably sieved from litter in lowland to upland rain forest. This is probably a ground-living, non-hygrophilous species.

Etymology. The name refers to the sharply angulate lateral apical angles of the elytra.

Appendix

Key to the species of the *brunnea*-group of the genus *Dicraspeda* Chaudoir

1. Legs wholly or in parts piceous to black 2.
– Legs completely yellow 4.
2. Lateral apical angles of elytra sharply angulate (Figs 17, 18); surface of elytra in basal third barely impressed, with superficial, though distinct microreticulation 3.
– Lateral apical angles of elytra rounded (Fig. 16); surface of elytra in basal third distinctly impressed, without perceptible microreticulation. Papua New Guinea *nigripes*, spec. nov.
3. Elytra in apical half not markedly widened, apex less deeply excised (Fig. 17); striae less coarsely punctate. Solomon Islands (Rennell Island) *inermis* Louwerens

- Elytra in apical half considerably widened, apex deeply excised (Fig. 18); striae more coarsely punctate. *Moluccas* *angulipennis*, spec. nov.
- 4. Striae deeply impressed, intervals clearly convex (doubtful species under both couplets) .. 5.
 - Striae not impressed, intervals depressed 7.
- 5. Striae less deeply impressed, intervals near base gently convex, in apical half depressed; surface of elytra with superficial microreticulation; orbits more oblique, less transversal (Fig. 13). Vanatua (New Hebrides) *hebridarum* Baehr
 - Striae deeply impressed, intervals convex almost towards apex; surface of elytra with distinct microreticulation; orbits less oblique, more transversal (Figs 8-10). Distribution different 6.
- 6. Surface of elytra more convex, striae more coarsely punctate; surface of elytra in basal third with perceptible transverse impression, apex of elytra little excised, lateral apical angles obtuse (Figs 8, 9). Indonesia, Philippines, southern Thailand *brunnea* Chaudoir
 - Surface of elytra more depressed, striae less coarsely punctate; surface of elytra in basal third without perceptible transverse impression, apex of elytra deeply excised, lateral apical angles angulate (Fig. 10). Northern Australia *sublaevis* (Macleay)
- 7. Surface of elytra in basal third without perceptible transverse impression, with superficial though distinct microreticulation 8.
 - Surface of elytra in basal third with deep transverse impression, without perceptible microreticulation 9.
- 8. Punctures of elytral striae basally coarser, intervals near base slightly convex; orbits more oblique, less transversal (Fig. 13). Vanatua (New Hebrides) *hebridarum* Baehr
 - Punctures of elytral striae basally finer, intervals also near base depressed; orbits more transversal, less oblique (Fig. 11). Northern Queensland (Australia) *nitida* (Sloane)
- 9. Striae with very fine puncturation, punctures becoming obsolete towards apex; lateral apical angle of elytra angulate; orbits longer, more oblique (Fig. 12). Biak Is., Irian Jaya *obsoleta* Baehr
 - Striae with coarser puncturation, punctures distinct towards apex; lateral apical angle of elytra obtuse; orbits shorter, more transversal (Figs 14, 15). Distribution different 10.
- 10. Pronotum generally shorter and wider (ratio l/w 1.05-1.09); elytra shorter on the average (ratio l/w 1.47-1.50); apex of elytra more deeply excised, base with barely perceptible transverse impression (Fig. 14). Cape York Peninsula, northern Queensland, Australia *glabrata*, spec. nov.
 - Pronotum generally longer and narrower (ratio l/w 1.08-1.13); elytra shorter on the average (ratio l/w 1.51-1.53); apex of elytra less deeply excised, base with distinct transverse impression (Fig. 15). Papua New Guinea *papuensis*, spec. nov.

For easier recognition measurements and ratios of all species are compiled in the following table. For *D. brunnea* the full variation is given.

	N	length	length/width of prothorax	width head/prothorax	length/width of elytra
<i>brunnea</i>	19	5.5-6.5	1.11-1.16	1.07-1.16	1.48-1.58
<i>sublaevis</i>	5	5.7-6.3	1.08-1.11	1.16-1.19	1.51-1.55
<i>nitida</i>	12	5.8-6.2	1.08-1.10	1.08-1.12	1.58-1.62
<i>obsoleta</i>	1	5.8	1.05	1.02	1.52
<i>hebridarum</i>	8	5.8-6.7	1.09-1.13	1.02-1.08	1.54-1.58
<i>glabrata</i>	5	5.8-6.1	1.05-1.09	1.07-1.11	1.47-1.50
<i>papuensis</i>	3	5.8-5.9	1.08-1.13	1.10-1.13	1.51-1.53
<i>nigripes</i>	3	6.0-6.3	1.11-1.13	1.10-1.12	1.53-1.54
<i>inermis</i>	1	6.3	1.13	1.11	1.51
<i>angulipennis</i>	3	6.1-6.7	1.14-1.18	1.09-1.15	1.52-1.55

**Alphabetical checklist of the species of the
brunnea-group of the genus *Dicraspeda* Chaudoir**

angulipennis, spec. nov.

MOLUCCAS: Halmahera, Morotai, Ternate

brunnea Chaudoir, 1862

THAILAND: Phuket; INDONESIA: Borneo,
Java, Bali, Lombok, Sulawesi, Timor; PHILIP-
PINES: Mindanao, Luzon, Leyte

glabrata, spec. nov.

AUSTRALIA: n. Queensland (mid-Cape York
Peninsula)

hebridarum Baehr, 1998

VANUATU: Aneityum Is., Iririkil Is.

inermis Louwerens, 1970

SOLOMON IS.: Rennell Is.

nigripes, spec. nov.

NEW GUINEA: Papua New Guinea

nitida (Sloane, 1917)

AUSTRALIA: n. Queensland (south of Cape
York Peninsula)

obsoleta Baehr, 1996

NEW GUINEA: Irian Jaya: Biak Is.

papuensis, spec. nov.

NEW GUINEA: Papua New Guinea

sublaevis (Macleay, 1888)

AUSTRALIA: n. Northern Territory, n. West-
ern Australia

Remarks

Certainly, all species of the *brunnea*-group are still very closely related which can be gathered from the remarkably similar male genitalia and the likewise generally very similar external shape and structure. Main differences are in coloration of antennae and legs, relative shape of pronotum and elytra, shape of apex of elytra, and degree of puncturation and microreticulation of elytra.

The phylogenetic relationships are not easily tracked within a group of extremely similar and most probably still very closely related taxa. This applies even more, because the adelphotaxon of the 'genus' *Dicraspeda* is still unknown and the phylogenetic relationships within the whole subfamily Odacanthinae are little understood. So, at the present state of knowledge, any formal phylogenetic argumentation (as matrix and/or cladogram) seems not justified, and only rather tentative considerations about phylogenetic relationships of the species are possible now.

If deeply impressed and coarsely punctate elytral striae, distinct microreticulation of elytral inter-

vals, shallow excision of the apex of elytra, and obtuse or rounded external apical angles can be considered plesiomorphic character states – which can be postulated with some reasons by comparison with the other species of the genus *Dicraspeda* on the one hand, and with related genera like *Eudalia* Castelnau, *Crassacantha* Baehr, and *Renneria* Baehr on the other – then *D. brunnea* Chaudoir should represent the most plesiotypic species of the group, at least with respect to the mentioned characters. All other species in one or another character state deviate from this presumable morphological "ground-plan" of the species-group.

D. brunnea also is the single species to occur outside the Papuan-Australian area, as it occurs on the Greater Sunda Islands, the Philippine Islands, and even on the Asian continent in southern Thailand, whereas all other species are confined to the Australian and Papuan subregions of the Australian region including the Moluccas (apart from Sulawesi). At the same time, the ranges of all species, except for that of *D. brunnea*, are much more limited and either are confined to New Guinea or even only to parts of this island, or to Northern or Northeastern Australia, or to Solomon Islands, or to Vanuatu, or to the smaller Moluccan islands.

In some respects, *D. sublaevis* (Macleay) is most similar to *D. brunnea* and perhaps next related to it. This is not too surprising, because *D. brunnea* occurs on Timor which is rather close to the range of *D. sublaevis* in northern and northwestern Australia.

D. nitida (Sloane), *D. obsoleta* Baehr, *D. hebridarum* Baehr, *D. glabrata*, spec. nov., *D. papuensis*, spec. nov., and probably also *D. nigripes*, spec. nov. seem to constitute a group of very closely related taxa, with *D. nitida* from eastern Queensland, *D. papuensis* from Papuan New Guinea and *D. hebridarum* from Vanuatu probably being the most plesiotypic members, while *D. glabrata* from the Cape York Peninsula in northeastern Australia, but even more *D. obsoleta* from Biak Island on the one hand, and *D. nigripes* from Papua New Guinea, on the other, are most apotypic.

D. inermis Louwerens from Solomon Islands and *D. angulipennis*, spec. nov. from the lesser Moluccan Islands again form a group of closely related and, at the same time, rather apotypic species.

For the following considerations it should be remembered that the insular belt that runs from the Greater Sunda Islands in the north and northwest, to the Moluccas and New Guinea in the south and southeast, since a long time has been noted as a major area of faunal transition, where Oriental and Papuan-Australian faunal elements have intermixed to a remarkable extent. To clarify the difficult situation, some 'lines' have been drawn by early bioge-



Fig. 19. The Oriental and Papuan-Australian area of faunal transition and the important zoogeographic lines. 1: Wallace's line; 2: Weber's line; 3: Lydekker's line.



Fig. 20. Distribution of the species of the *brunnea*-group of the genus *Dicraspeda* Chaudoir. *D. brunnea* Chaudoir: —; *D. sublaevis* (Macleay): ●; *D. nitida* (Sloane): - - - -; *D. obsoleta* Baehr: ▲; *D. hebridarum* Baehr: ▼; *D. glabrata*, spec. nov.: ■; *D. papuensis*, spec. nov.: +; *D. nigripes*, spec. nov.: ◆; *D. inermis* Louwerens: X; *D. angulipennis*, spec. nov.: *.

ographers that should depict certain faunal boundaries, or better, lines of faunal balance or of a certain procentual degree of preponderance of the Australian faunal elements over the Oriental ones, or *vice versa* (Fig. 19). The most familiar lines are 'Wallace's line' that runs between Borneo and Sulawesi, and Bali and Lombok, and that depicts an approximate equilibrium of elements of both faunal provinces; 'Weber's line' that runs east of Timor and Sulawesi but west of the Moluccas, and that depicts a more than 75 % advantage of Papuan-Australian faunal elements and also marks the western boundary of some Papuan-Australian elements; and 'Lydekker's line' that divides New Guinea and some nearby islands from the Moluccas and marks the Papuan (and Australian) faunal province(s) in their most restricted sense. These lines were drawn, and it was easily possible to draw them there, because at their position the character of the fauna changes within extremely short distances, in some localities even from one small island to the neighbouring island within sight. These radical changes, on the other hand, are evidence of very old faunal boundaries that were preserved until today, but apparently without any present obvious reason.

If the somewhat tentative phylogenetic considerations explained above would prove right, the distribution pattern of the *brunnea*-group would be quite characteristic in the light of these faunal borders. Then the most plesiotypic species (*D. brunnea*) not only has by far the widest range, but it also is the species the range of which is situated to the Northwest of all other species. Thus, it is the single species that almost exclusively ranges in the Oriental Region or at least, does not exceed Weber's line to the east. All other species are arranged in a about semi-circular manner to the southeast of the range of *D. brunnea*, and all are exclusively Papuan or Australian faunal elements. The ranges of all other species are minimal as compared with that of *D. brunnea*, and it seems, as if taxa or stocks repeatedly had separated from the eastern margin of the range of *D. brunnea*. However, these speciation events probably have not been occurred regularly, but rather discontinuously and irregularly. And moreover, such separation or speciation events probably not always occurred in a northwest to southeast direction, but in some instances even in the reverse direction.

Some examples are given for these hypotheses. New Guinea might have been colonized by a single stock that came from the west, that in this extremely montane and rugged island developed very rapidly into several surprisingly different species. The most plesiotypic species of this group today seems to be *D. papuensis*, and from a very similar ancestor not

only the other New Guinean species may have been derived, but also the species that presently inhabit northeastern Australia, and likewise *D. hebridarum* from remote Vanatua.

Australia apparently was invaded twice, namely from the Lesser Sunda Islands or even just from Timor into Northern Territory and northwestern Australia (present *D. sublaevis*), via Timor Sea which was less than half as wide as today during the glacial periods of Ice Age; and also from New Guinea via Cape York Peninsula (*D. nitida* and *D. glabrata*), from a stock that also gave birth to *D. papuensis*. *D. nitida* and *D. glabrata* of northeastern Queensland are still closely related. Although *D. glabrata* seems slightly more apotypic than *D. nitida*, today it lives to the north of the latter, and thus, speciation probably has occurred at the northern margin of the range of the ancestor of the present *nitida* population. Again, in this group, the probably more plesiotypic species has the larger range than its apotypic offspring.

Another case of a speciation event at the western margin of a population can be noted in *D. obsoleta* of Biak Island that most probably likewise stems from a *papuensis*-like ancestor. And what about the pair *D. inermis* and *D. angulipennis*, in which the Moluccan *D. angulipennis* seems the more apotypic and, therefore, younger species?

These few examples clearly demonstrate 1. that we know much too less about systematics and distribution of this group to be able to draw any conclusive picture of its biogeographic history; 2. that the speciation events within this group most probably were quite complex and did not proceed in one-way direction; and 3. that the Papuan Subregion including the Moluccas again proves to represent one of the most complex and prolific transition areas of the world.

Apart from these problems, some other questions must be left open so far. Why no additional taxa evolved in the Oriental Region, or, with other words, why *D. brunnea* or its ancestral population did not split into several species, in spite of its very wide range that includes areas exhibiting quite different ecological conditions? This is even more puzzling, because probably there was more time left for the evolution of additional taxa in the Oriental Region than it was in New Guinea or even in the remote Solomon and Vanatua island belts.

So, it has to be stated that the whole genus *Dicraspeda* in its widest sense (including '*Philemonia*' and '*Macrocentra*') occurs in the Papuan and Australian (sub)regions, with the single exception of *D. brunnea*. Although, at the first glance, this genus clearly seems to be of Papuan origin – judging from the large number and high diversity of

species occurring there – the (probably) most plesiotypic species occurs exclusively in the Oriental Region and does not exceed the boundaries of this region to the east. This would mean, then, that the origin of the genus should have been in the Oriental Region, whereas the high diversity in the Papuan and Australian regions was a subsequent process after immigration of one (or several) original stock(s) into these areas. Here, again, we note a northern lineage immigrating the Papuan-Australian Region that only after this immigration experienced a period of rapid evolution and taxonomic diversification. Metaphorically spoken: the genus *Dicraspeda* first had to jump over Weber's line to be able to further evolution. But then, the question arises again: why this evolution and taxonomic diversification was not possible in the vast insular belt of the southern Oriental Region?

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References

Baehr, M. 1996. Three new species of the genus *Dicraspeda* Chaudoir from New Guinea (Insecta, Coleoptera, Carabidae, Odacanthinae). – *Spixiana* **19**: 137-146

-- 1997. Three further new species of the genus *Dicraspeda* CHAUDOIR from New Guinea (Coleoptera, Carabidae, Odacanthinae). – *Mitt. Münch. Ent. Ges.* **87**: 29-37

-- 1998. Two further new species of the genus *Dicraspeda* Chaudoir from New Guinea and the New Hebrides (Insecta, Coleoptera, Carabidae, Odacanthinae). – *Entomofauna* **19**: 173-184

-- 1999. A new genus of Odacanthinae from northern central Australia (Insecta, Coleoptera, Carabidae). – *Coleoptera* **2**: 115-119

-- 2000. Some genera and species of ground beetles new to Australia (Coleoptera: Carabidae). – *Mem. Qld. Mus.* **46**: 9-14

-- 2003. A peculiar new genus of Odacanthinae from northern Australia (Insecta, Coleoptera, Carabidae). – *Monogr. Mus. reg. Sci. Nat. Torino* **35**: 99-110

Chaudoir, M. de 1862. Matériaux pour servir à l'étude des Carabiques. 3^e partie. – *Bull. Soc. Imp. Nat. Moscou* **35**: 275-320

Csiki, E. 1932. *Coleopterorum Catalogus. Pars 124, Harpalinae VII: 1279-1598.* – W. Junk, Berlin

Darlington, P. J. Jr. 1968. The Carabid beetles of New Guinea. Part III. Harpalinae continued. Perigonini to Pseudomorphini. – *Bull. Mus. Comp. Zool.* **137**: 1-253

Liebke, M. 1938. *Denkschrift über die Carabiden-Tribus Colliurini.* – *Festschrift für Prof. Dr. Embrik Strand* **4**: 37-141

Lorenz, W. 1998. *Systematic List of extant Ground Beetles of the World (Insecta Coleoptera "Geadephaga": Trachpachidae and Carabidae incl. Paussinae, Cicindelinae, Rhyssodidae).* – Tutzing, printed by the author. 502 pp.

Louwerens, C. J. 1970. The Carabidae of Rennell and Bellona Islands, with a few records from Guadalcanal (Solomon Islands.). In: Wolff, T. (ed.): *The natural history of Rennell Island, British Solomon Islands. Scientific results of the Noona Dan Expedition 1962 and the Danish Rennell Expedition 1965, Vol. 6, Zoology: 87-92.* – Danish Science Press, Copenhagen

Macleay, W. J. 1888. The insects of King's Sound and its vicinity. – *Proc. Linn. Soc. New South Wales* **3**: 443-480

Moore, B. P., T. A. Weir & J. E. Pyke. 1987. Rhyssodidae and Carabidae. In: *Zoological Catalogue of Australia*, **4**: 17-320. – Austr. Governm. Publ. Serv., Canberra

Sloane, T. G. 1917. Carabidae from tropical Australia (New genera and species, notes and synonymy, and synoptic tables. Tribes Scaritini, Harpalini, Odacanthini, Lebiini, and Heliuonini). – *Proc. Linn. Soc. New South Wales* **42**: 406-438

-- 1923. *Studies in Australian Entomology. No. XVIII.* new genera and species of Carabidae (Scaritini, Pterostichini, Merizodini, Bembidiini, Trechini, Odacanthini, Panagaeini, Licinini, and Lebiini). – *Proc. Linn. Soc. New South Wales* **48**: 17-39